

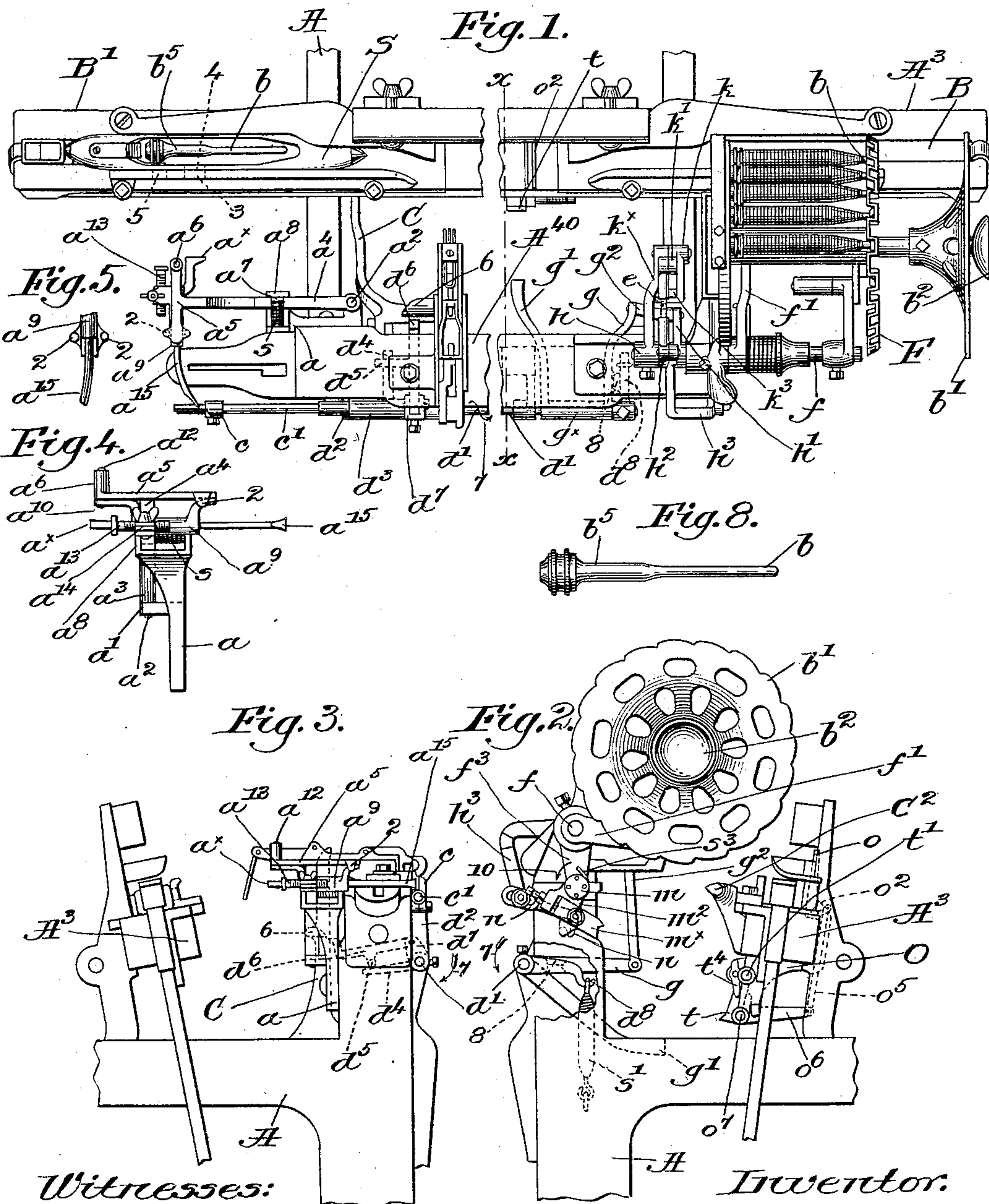
(No Model.)

2 Sheets—Sheet 1.

J. H. NORTHROP.
LOOM.

No. 600,016.

Patented Mar. 1, 1898.



Witnesses:

W. C. Harmon.

Thomas J. Drummond.

Inventor.

James H. Northrop.

by Wesley Gregory.

Atty.

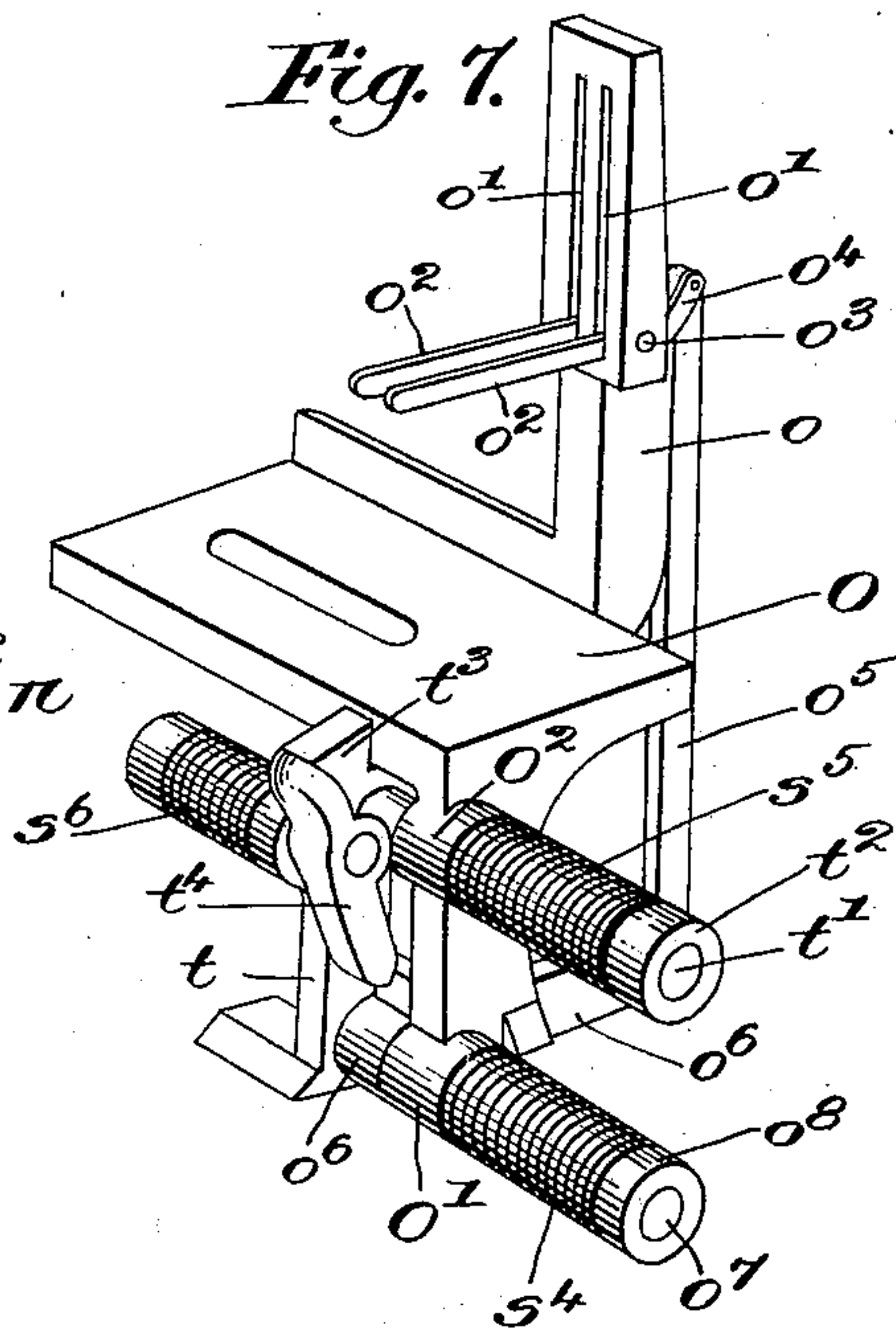
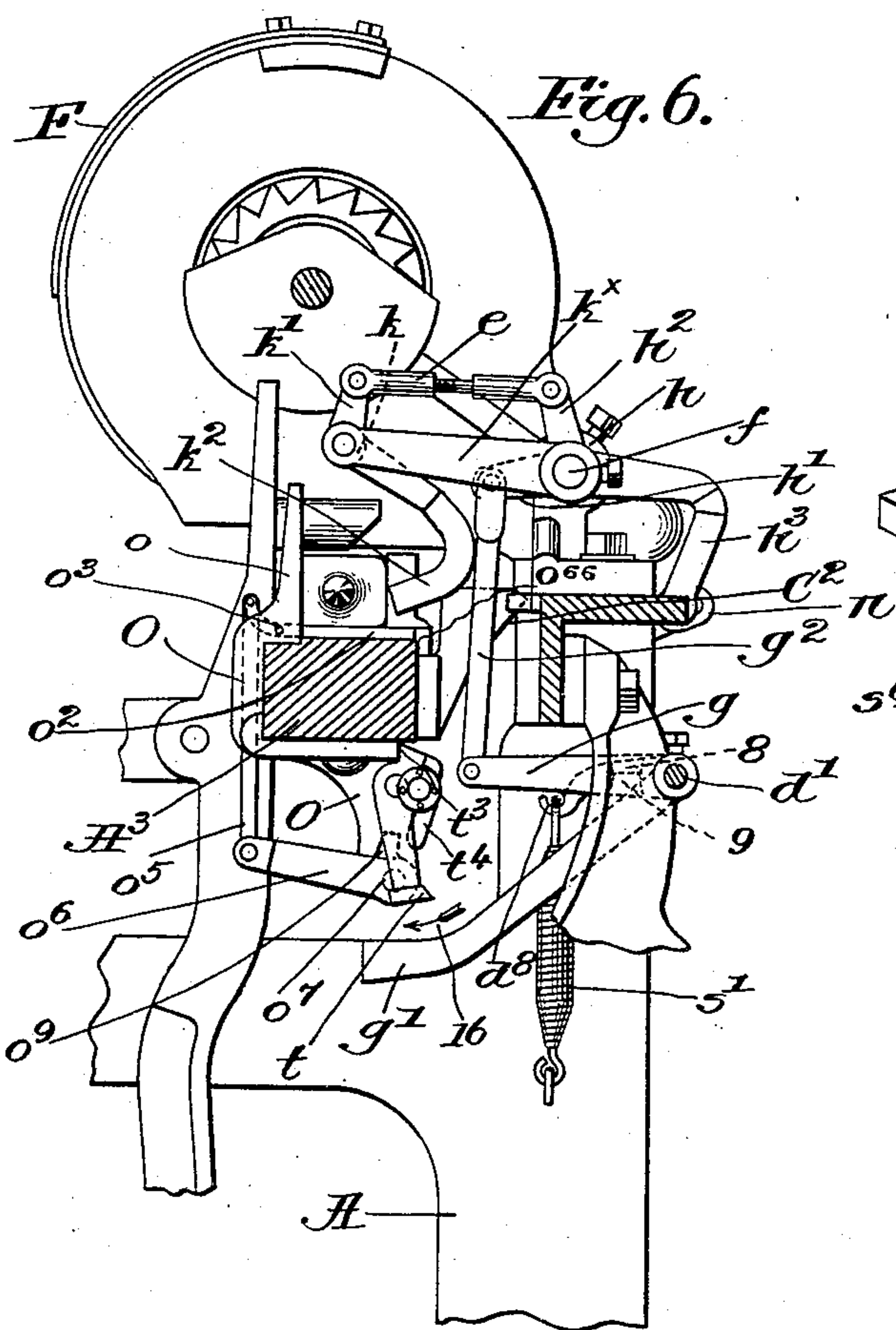
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UNITED STATES PATENT OFFICE.

JAMES H. NORTHROP, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR TO THE DRAPER COMPANY, OF PORTLAND, MAINE, AND HOPEDALE, MASSACHUSETTS.

LOOM.

SPECIFICATION forming part of Letters Patent No. 600,016, dated March 1, 1898.

Application filed October 8, 1897. Serial No. 654,513. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. NORTHROP, of Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Looms, of which the following description, in connection with the accompanying drawings, is a specification, like letters and numerals on the drawings representing like parts.

This invention relates more particularly to that class of looms for weaving wherein the shuttle is automatically provided with a fresh supply of filling upon the failure or exhaustion of the filling carried by the shuttle, such a loom forming the subject-matter of United States Patent No. 529,940, dated November 27, 1894.

It has been found necessary in practice to provide for the automatic transfer of a fresh supply of filling to the shuttle before the complete exhaustion of the filling then in the shuttle, and the filling-supplying mechanism has been controlled as to its operation by a feeler or detector cooperating with the filling in the shuttle, the movement of the feeler effecting the operation of the filling-supplying mechanism when the filling has been exhausted to a predetermined amount. So, too, with such an apparatus it is absolutely necessary to have a thread-severing device which will sever the filling-thread from the filling-carrier ejected from the shuttle before complete exhaustion of the filling thereon, as otherwise there would be two threads carried into the cloth until that from the first or ejected filling-carrier broke from the tension.

While the filling-feeler and the thread-severing features of my present invention are not broadly new, there are many novel features of construction, operation, and arrangement involved, all tending to the production of greater accuracy in the operation of the loom and increased uniformity in the product.

Figure 1 is a top or plan view, centrally broken out, of a sufficient portion of a loom to be understood with my present invention applied thereto. Fig. 2 is a partial right-hand end elevation of the loom shown in Fig. 1, part of the loom side being broken away to more clearly show some of the mechanism. Fig. 3 is a partial left-hand end view of the loom.

Fig. 4 is an enlarged detail in end elevation of the filling-feeler and cooperating mechanism. Fig. 5 is a detail, enlarged, of a part of the feeler mechanism to be referred to. Fig. 6 is a vertical sectional view of the loom on an enlarged scale, taken on the line *xx*, Fig. 1, looking toward the right, with the lay forward and the shuttle improperly positioned in the shuttle-box. Fig. 7 is an enlarged perspective view of the thread-severing mechanism, and Fig. 8 is an enlarged view of the filling-carrier shown in Fig. 1.

The loom-frame *A*, breast-beam *A*⁴⁰, the lay *A*⁸, having the bottom of one of its shuttle-boxes cut away below the self-threading shuttle *S*, the filling-feeder comprising connected rotatable plates suitably shaped to receive the ends of the filling-carriers *b*, the weft-thread-supporting plate *b'*, weft-end holder *b*², the stud *f*, transferrer *f'*, mounted thereon and having the depending end *f*³, and the shaft *d'*, adapted to be rotated by the movement of the weft-fork in the absence of the filling are and may be all as represented in said Patent No. 529,940, wherein like letters and numerals are used to designate like parts, the parts hereinbefore referred to being operated substantially as therein provided for.

I have shown in Fig. 1 the filling-feeder (indicated by the letter *F*) as located at one side of the loom and adapted to transfer a fresh supply of filling to the shuttle when in the adjacent shuttle-box *B*, while the feeler mechanism is located at the other side of the loom, the feeler operating when the shuttle is in the box *B'*.

At the inner side of the breast-beam, substantially opposite the shuttle-box *B'*, I have mounted a stand or bracket *a*, provided with an ear *a'*, supporting an upright stud *a*², on which is mounted loosely the hub *a*³ of a substantially T-shaped feeler-carrier *a*⁴, the head *a*⁵ having on its inner end an upturned hub *a*⁶. A suitable spring *s* bears at one end against a part of the bracket *a* and at its other end against a lug *a*⁷ on the feeler-carrier to normally hold the latter in the position shown in Fig. 1, with the lug *a*⁷ against a limiting-stop *a*⁸ on the bracket.

The outer end of the part *a*⁵ of the feeler-carrier is downturned to form ears 2 2 at op-

posite sides of the upturned end of an arm a^9 , which is bent up at a^{10} and provided with a pintle a^{12} , extended up loosely into the hub a^6 of the carrier and sustained thereby, the bent-up end a^{10} clearing the shuttle-box when the lay beats up. At one side of the bent-up end a^{10} the arm is rearwardly extended to form the filling-feeder a^x , its extremity being preferably extended laterally, as shown best in Fig. 1, and adapted to pass through an aperture 3 in the front wall of the shuttle-box B' as the lay beats up. If the shuttle is properly positioned in the box, as in Fig. 1, the feeler will pass through a slot 4 in the wall of the shuttle and will bear upon the mass of filling on the filling-carrier or bobbin b until exhaustion of filling to a predetermined point, the pressure thus exerted upon the feeler tending to first swing the arm a^9 on its fulcrum a^{12} to the left, Fig. 1, until engaged by one of the ears 2, after which the feeler-carrier will be swung bodily toward the front of the loom. A threaded stud a^{13} is adjustably held in a bearing a^{14} , laterally extended from the arm a^9 , so that the feeler and stud are located at opposite sides of the fulcrum a^{12} , the stud being adapted to enter an aperture 5 in the wall of the adjacent shuttle-box as the lay comes forward and bear against the wall of the shuttle S when in the box.

It will be noticed that the feeler projects beyond the stud a^{13} and normally engages the filling before the stud engages the side of the shuttle; but as the filling is drawn off and the wound mass decreases in diameter the stud and feeler will finally engage at the same time, and when the filling has been exhausted to a predetermined amount the stud will engage first, and then the arm a^9 will be swung to the right, Fig. 1, bringing a dagger a^{15} carried thereby into abnormal position, ready to engage and move an ear c on a rod c' and moving the latter forward as the lay completes its forward stroke.

It will be seen that the movement imparted to the rod c' is effected by swinging of the feeler-carrier a^4 , due to engagement of the stud a^{13} with an unyielding object, as the shuttle-wall, thus obviating any possibility of improper operation which might occur were the movement dependent upon engagement of the feeler with the filling-carrier, as the latter might yield under the stress.

The filling-carrier or bobbin shown in Fig. 1 is of peculiar construction, but the same is not claimed herein, as it is not of my invention, the construction being such that the filling-feeler will always engage some part of the larger cylindrical portion b^5 of the carrier after the filling has been exhausted to a predetermined extent.

By means of the adjustable stud a^{13} the feeler may be arranged to act, preferably, when the larger part b^5 of the filling-carrier is bare of filling while some yet remains on the remainder of the carrier, and thus a very

accurate determination effected of the time at which transfer of a fresh supply of filling shall take place.

The rod c' is rigidly mounted in an arm d^2 , having its hub d^3 loose on the rock-shaft d' , so that the described movement of said rod will lift a finger d^4 , (see dotted lines, Figs. 1 and 3,) fast on the hub, said finger in turn acting on a lug d^5 , forming part of and lifting a latch d^6 , pivoted to an arm d^7 , fast on the rock-shaft d' , the latch being thus brought into position to be engaged by a projection 6 on the usual weft-hammer C, the forward movement of the latter rocking the shaft d' in the direction of arrow 7, Figs. 1, 2, and 3.

As shown best in Figs. 2 and 6, a hooked arm d^8 , fast on the rock-shaft, has secured to it one end of a strong spring s' , the other end of the spring being attached to the loom-frame and tending to rotate the shaft oppositely to the arrow 7. The hooked arm is provided with a lug 8 above and cooperating with a projection 9 on an arm g , fast on a hub g^x , Fig. 1, loosely mounted on the rock-shaft d' , said hub having also fast thereon a normally inoperative dagger g' to actuate the thread-severing mechanism, as will be described.

Referring more particularly to Figs. 2 and 6, the arm g is connected by a link g^2 to one of the arms h' of a sleeve or hub h , rotatably mounted on the stud f , said hub being provided with a second upturned arm h^2 , pivotally connected to one end of an adjustable link e , as in United States Patent No. 568,455, granted to me September 29, 1896, and to which reference may be had. The other end of the link is jointed to an arm k' of a hub k as in said patent, provided with a downwardly and laterally bent arm k^2 , forming the shuttle-feeler, the hub k being pivotally mounted on an arm k^x , rigidly secured to the stud f , the lower end of the shuttle-feeler being turned toward the lay to engage the shuttle, if the latter is improperly positioned in the shuttle-box. As in said Patent No. 568,455, a spring-controlled rocker-stud m is mounted in the depending end f^3 of the transferer, the spring s^3 normally tending to turn the stud in the direction of the arrow 10, Fig. 2, the stud having an arm m^2 , on which is adjustably secured a notched dog m^x , the dog being moved into position to be engaged by a bunter C² on the lay when a filling-carrier is to be transferred to the shuttle, provided the shuttle is properly positioned.

The hub h has a third arm h^3 , downturned and laterally bent and connected, adjustably, at its lower extremity to a downturned finger n , as in said patent, the finger acting to control the arm m^2 at times—that is to say, when the loom is running properly, as shown in Figs. 2 and 6, the dog m^x is depressed and out of the path of the bunter C², the link g^2 being held down by its connection with the rock-shaft d' , said link acting to hold the bent arm h^3 elevated, so that the finger n ,

acting on the arm m^2 , swings the latter forward to turn the stud m against the force of the spring s^3 and maintaining the dog m^x in inoperative position. Now should the filling fail the rock-shaft d' will be turned to elevate the link and permit the dog to be brought into operative position to be acted upon by the bunter C^2 to effect the transfer of a fresh filling-carrier from the filling-feeder to the shuttle, provided the shuttle is properly positioned in the shuttle-box, and at such times the shuttle-feeler k^2 will not engage the shuttle. It is to be borne in mind that such movement of the rock-shaft d' would also elevate the dagger g' to actuate the thread-severing mechanism, (to be described,) so that the thread from the ejected filling-carrier will be severed. If, however, the shuttle is improperly positioned in the box, a fresh filling-carrier will not be transferred to the shuttle, and it is of course desirable that the thread-severing mechanism shall not operate.

Referring to Fig. 6, the shuttle is supposed to be improperly positioned and by engaging with the shuttle-feeler k^2 has prevented the elevation of the arm g . Even though the rock-shaft d' may be turned such movement will only elevate the hooked arm d^8 against the action of its spring s' , and as the arm g is not elevated the dagger g' will remain in inoperative position. Upon exhaustion of the filling to a predetermined extent the filling-feeler will detect such exhaustion, and, as has been described, the stud a^{13} will be acted upon by the side wall of the shuttle as the lay comes forward to move the dagger a^{15} into position to engage the ear c and effect the operative movement of the rock-shaft d' to cause a change of filling, if the shuttle is properly positioned in the shuttle-box. The lay has secured to its rear side a bracket O , provided with an upright o , vertically slotted at its upper end at o' , as shown in Fig. 7, to receive, as therein shown, one or more knives or cutting-blades o^2 , fulcrumed at o^3 and upturned at their rear ends, as at o^4 , the said blades normally resting in a transverse recess o^{66} in the raceway of the lay, (see Fig. 6,) the shuttle in its flight across the raceway laying the filling-thread above the blades. The rear ends of the blades are connected by a link o^5 with a rocker-arm o^6 , provided with a laterally-fulcrumed stud o^7 , extended through a hub O' of the bracket, a collar o^8 , fast on said stud, having secured to it one end of a spring s^4 , the other end of the spring being attached to the hub O' and tending to normally retain the arm o^6 in the position shown in Figs. 6 and 7, with the severing-blades in inoperative position. A dog t is pivotally mounted on the bracket O by means of a stud t' , extended loosely through a hub O^2 , the dog being normally held in the position shown in said Figs. 6 and 7 by means of a spring s^5 , connected at its ends to the hub O^2 and a collar t^2 , fast on the stud, a stop t^3 on the dog bearing against

a part of the bracket. This dog is adapted to be engaged and moved in the direction of the arrow 16, Fig. 6, by the dagger g' , when the latter is moved into operative position, as has been described, such movement of the dog acting through a spring-controlled latch t^4 to depress the rocker-arm o^6 and thereby swing the cutting-blades upward on their fulcrum to sever the filling between the blades and the slotted part of the upright o . The latch t^4 is controlled by a spring s^6 , the latter acting to normally retain the upper end of the latch against the front side of the stop t^3 , the lower end of the latch being adapted to engage an ear o^9 on the rocker-arm o^6 when the dog t is engaged and moved in the direction of the arrow 16 by the dagger g' . The rocker-arm will be thus depressed until the lower end of the latch t^4 can slide over and back of the ear o^9 , thus suddenly releasing the rocker-arm and permitting its controlling-spring s^4 to return it to normal position, whereby the blades o^2 will be moved below the path of and out of the way of the shuttle after severing, as described, the filling-thread of the filling-carrier to be ejected. As the lay moves back and disengages the dog t and dagger g' the spring s^5 will return the dog to normal position, and during such movement the spring s^6 will permit the latch t^4 to snap past the ear o^9 .

It will be obvious that the thread-severing mechanism will not be operated unless the shuttle is properly positioned in the shuttle-box, and from the foregoing description it will also be clear that the thread-severing mechanism will be operated just before a fresh filling-carrier is inserted in the shuttle, said mechanism severing the thread of the filling-carrier to be ejected.

The filling-supplying mechanism is controlled as to its operation by the filling-feeler, feeler-carrier, and stud a^{13} , the dagger a^{15} and connections between it and the said filling-supplying mechanism, and hereinafter in some of the claims I have designated such devices generically as controlling means for the filling-supplying mechanism. The stud a^{13} may be termed the "actuator" for said controlling means, and it is governed by the filling-feeler, the latter determining when the operative movement of the controlling means shall be effected by the engagement of the shuttle-body with the actuator.

So far as I am aware, it is broadly new to effect the change of filling by or through the operation of controlling means engaged and actuated by the shuttle-body, the filling-feeler serving to determine the time of action of the controlling means.

My invention is not restricted to the precise construction and arrangement of parts as herein shown, as it will be obvious that the same may be modified or rearranged in various particulars without departing from the spirit and scope of the invention.

Having fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a loom, a shuttle containing a supply of filling, filling-supplying mechanism, controlling means for said mechanism, actuated by engagement with the shuttle-body, and a filling-feeler to govern the operation of said controlling means to actuate the filling-supplying mechanism upon exhaustion of the filling in the shuttle to a predetermined extent, substantially as described.

2. In a loom, a shuttle containing a supply of filling, filling-supplying mechanism, controlling means for said mechanism, including an actuator, and a dagger to effect the operation of the filling-supplying mechanism, and a feeler to cooperate with the filling and permit movement of the actuator into position to be engaged and moved by the shuttle-body upon exhaustion of the filling therein to a predetermined point, substantially as described.

3. In a loom, a shuttle containing a supply of filling, a transferrer to transfer a fresh supply of filling to the shuttle, controlling means therefor including an actuator moved by engagement with the shuttle-body, a filling-feeler to govern the position of said actuator in accordance with the amount of filling in the shuttle, and means to prevent the operation of the transferrer by said controlling means when the shuttle is improperly positioned in the shuttle-box, substantially as described.

4. In a loom, a shuttle having a slotted side and containing a supply of filling, filling-supplying mechanism, controlling means for said mechanism, actuated by engagement with the shuttle-body, and a feeler to enter the slot in the shuttle and cooperate with the filling, to thereby determine the operative movement of said means, substantially as described.

5. In a loom, a shuttle having a slotted side and containing a supply of filling; filling-supplying mechanism located at one side of the loom; a filling-feeler pivotally mounted at the other side of the loom independently of the shuttle and adapted to enter the slot therein and cooperate with the filling; and an actuator controlled by said feeler and engaged and moved by the shuttle-body when the filling is exhausted to a predetermined extent, combined with connections between said actuator and the filling-supplying mechanism, to effect the operation thereof when the actuator is moved by the shuttle-body in the forward movement of the lay, substantially as described.

6. In a loom, a shuttle having a slotted side and containing a supply of filling; filling-supplying mechanism; a swinging feeler-carrier; a connected filling-feeler and an actuator, pivotally mounted thereon, said feeler permitting movement of the actuator into position to be engaged by the shuttle-body upon exhaustion of the filling to a predetermined extent, and operating connections between

the said actuator and the filling-supplying mechanism, forward movement of the lay swinging the feeler-carrier to effect the operation of said mechanism, substantially as described.

7. In a loom, a shuttle having a slotted side and containing a supply of filling; filling-supplying mechanism; a swinging feeler-carrier; a connected filling-feeler and an actuator, pivotally mounted thereon, said feeler permitting movement of the actuator into position to be engaged by the shuttle-body upon exhaustion of the filling to a predetermined extent, and a dagger moved into operative position when the actuator is engaged by the shuttle-body, combined with means controlled by said dagger when in operative position, to effect the operation of the filling-supplying mechanism, substantially as described.

8. In a loom, a shuttle containing a supply of filling, filling-supplying mechanism, and controlling means for said mechanism, including a pivotally-mounted actuator, operated by engagement with the shuttle-body on the forward beat of the lay, combined with a feeler connected rigidly with the actuator and cooperating with the filling to maintain the said actuator inoperative until the filling is exhausted to a predetermined extent, substantially as described.

9. In a loom, a shuttle containing a supply of filling, filling-supplying mechanism, a spring-controlled feeler-carrier, a filling-feeler pivotally mounted thereon and having a dagger, the feeler normally retaining the dagger inoperative, and an actuator for the dagger, operative by engagement with the shuttle-body upon exhaustion of the filling to a predetermined extent, to move the feeler-carrier against its spring, and connections between the dagger and filling-supplying mechanism, substantially as described.

10. In a loom, a shuttle containing a supply of filling, filling-supplying mechanism, controlling means therefor, including an adjustable actuator, operated by engagement with the shuttle-body, and a filling-feeler to govern said actuator and retain it inoperative until the filling has been exhausted to a predetermined extent, substantially as described.

11. In a loom, a shuttle adapted to carry a supply of filling, severing mechanism to sever the filling-thread when the filling has been exhausted to a predetermined extent, means operated by engagement with the shuttle-body in the forward beat of the lay, to actuate said mechanism, and a filling-feeler cooperating with the filling and controlling the operation of said means, substantially as described.

12. In a loom, a shuttle adapted to carry a supply of filling, severing mechanism to sever the filling-thread when the filling has been exhausted to a predetermined extent, means, including a dagger, operated by engagement with the shuttle-body in the movement of the lay, to actuate said mechanism, a rigidly-connected filling-feeler to move said dagger

into operative position upon exhaustion of the filling to the predetermined extent, substantially as described.

13. In a loom, a shuttle adapted to carry a supply of filling, severing mechanism to sever the filling-thread when the filling has been exhausted to a predetermined extent, filling-supplying mechanism to cause a new supply of filling to be placed in the shuttle when the former supply shall have been exhausted to the predetermined extent, means operated by engagement with the shuttle-body in the movement of the lay, to actuate said filling supplying and severing mechanisms, and a filling-feeler cooperating with the filling, to control the operation of said means, substantially as described.

14. In a loom, severing mechanism to sever the filling, a rocker-arm having a lug and forming a part of said mechanism, and a dog provided with a spring-controlled latch, to engage the lug when moved in one direction and thereby operate said mechanism, and to snap over said lug on the return movement, combined with a dagger to at times move the dog, a feeler adapted to contact with the filling, and connections between said feeler and the dagger, to move the latter when a filling-thread is to be severed, substantially as described.

15. In a loom, the lay, filling-severing mechanism carried thereby, including a blade or blades normally lying across the lay and a recess therein below the shuttle-path, and means to move said blade or blades upwardly

into engagement with and to sever the filling-thread, substantially as described.

16. In a loom, the lay, a slotted upright thereon, a pivotally-mounted blade normally lying across in a recess in the lay below the shuttle-path, and means to swing said blade upwardly to engage the filling-thread and sever the same between the blade and slotted upright, substantially as described.

17. In a loom, the lay, filling-severing mechanism carried thereby, including a pivoted, spring-controlled blade normally lying across the lay below the shuttle-path, means to lift the blade against its spring to engage and sever the filling-thread, and a releasing device to permit the blade to return to normal position by the action of its controlling-spring, substantially as described.

18. In a loom, the lay, filling-severing mechanism carried thereby, including a blade normally lying across the lay below the shuttle-path, means to move said blade upwardly and rearwardly into engagement with and to sever the filling-thread, a feeler adapted to contact with the filling, and operating connections between said feeler and the blade-actuating means, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES H. NORTHROP.

Witnesses:

HERBERT S. MANLEY,
GEO. OTIS DRAPER.